HEAT DISSIPATION MODULE FOR CPU

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a heat dissipation module for a CPU, and more particularly, to a heat dissipation module that has a simple structure and is easily assembled, disassembled and cleaned. The heat dissipation module includes a heat dissipation device with better heat dissipation effect to abut against the CPU tightly.

2. Background of the Invention

Because of the quick progress of the computer industry, the operational speed of a central processing unit (CPU) continually increases, and the generated heat of the CPU increases accordingly. In order to exhaust the heat generated by the CPU from the computer and let the CPU operate at permissible temperatures, a heat dissipation device with a large area is attached on a heat-exhausting surface of the CPU. Moreover, in order to let the heat dissipation device abut against the CPU tightly, a clipping device has been proposed to press the heat dissipation device on the CPU so as to improve the heat dissipation effect.

Referring to Fig. 1 and Fig. 2, a conventional CPU 90 is disposed on a mother board 91. A retention frame 92 is installed on the mother board 91, and the CPU 90 is disposed inside the retention frame 92. The retention frame 92 has a supporting protrusion 93 extending upwardly from each of four corners thereof. The supporting protrusions 93 each define a clipping hole 94. A heat dissipation device 95 is disposed on the CPU 90. The heat dissipation device 95 is made of a metal material with good thermal conductivity and has a plurality of fins 96 for increasing a heat dissipation area. In addition, a fan 97 is disposed

on the heat dissipation device 95 for assisting the CPU to distribute the heat.

A pair of clipping devices 98 is disposed on the heat dissipation device 95. In assembly, clipping elements 981 at two ends of each of the clipping devices 98 clip clipping holes 94 at the supporting protrusions 93 of the retention frame 92, respectively, such that the clipping device 98 is installed on the retention frame 92 in a clipping manner. When one pulls each pulling component 982 of each of the clipping devices 98, each cam portion 983 of each of the clipping devices 98 moves and the clipping devices 98 and the clipping elements 981 thereof are actuated to move upwardly, so that the clipping elements 981 at the two ends of the clipping devices 98 clip the clipping holes 94 of the retention frame 92 tightly. By using the above arrangement, the clipping devices 98 press the heat dissipation device 95 to force the heat dissipation device 95 to abut against a heat-exhausting surface of the CPU tightly to assist the CPU to exhaust heat. In disassembly, one pulls the pulling components 982 in reverse to separate the clipping elements 981 at the two ends of the clipping devices 98 from the clipping holes 94 of the retention frame 92, and then the clipping devices 98 and the heat dissipation device 95 can be disassembled.

However, the clipping device 98 adopted to a conventional heat dissipation module is complicated. In assembly or disassembly, it is laborious to pull the pulling components 982, which causes more costs. In addition, the conventional heat dissipation device 95 does not perform a good heat dissipation effect and is not easily cleaned.

Accordingly, as discussed above, the conventional heat dissipation module still has some drawbacks that could be improved. The present invention aims to resolve the drawbacks in the prior art.

SUMMARY OF INVENTION

The primary object of the invention is therefore to specify a heat dissipation module for CPU, which has a simple structure and is easily assembled or disassembled to decrease cost and to facilitate mass production.

Another object of the invention is to specify a heat dissipation module for CPU, which has a heat dissipation device that performs better heat dissipation and is easily cleaned.

According to the invention, the object is achieved via a heat dissipation module for CPU. The heat dissipation module is suitable to be installed on a retention frame disposed around the CPU and comprises a heat dissipation device, a fan-fixing frame and a fan. The heat dissipation device has a plurality of fins. The fins defines flow passageways therebetween. The fan-fixing frame is located on the heat dissipation device and has a top plate, four posts and a plurality of elastic pressing components. The posts extend downwardly from four corners of the top plate. Each post has a clipping element at a bottom thereof. The elastic pressing components are installed on the top plate. The fan is fixed on the top plate of the fan-fixing frame. The fan-fixing frame is disposed on the retention frame. The clipping elements at the bottoms of the posts of the fan-fixing frame respectively clip clipping holes at four supporting protrusions of the retention frame. The elastic pressing components thereby elastically press the heat dissipation device to abut against a heat-exhausting surface of the CPU.

To provide a further understanding of the invention, the following detailed description illustrates embodiments and examples of the invention. Examples of the more important features of the invention thus have been summarized rather broadly in order that the detailed description thereof that follows may be

better understood, and in order that the contributions to the art may be appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is an exploded perspective view of a heat dissipation module of the prior art for a CPU;

FIG. 2 is a perspective assembly view of the heat dissipation module of the prior art for a CPU;

FIG. 3 is an exploded perspective view of the present invention;

FIG. 4 is a perspective assembly view of the present invention;

FIG. 5 is a side elevational view of the present invention;

FIG. 6 is a perspective view of a fan-fixing frame of the present invention;

FIG. 7 is a perspective view of a heat dissipation device of the present invention; and

FIG. 8 is a cross-sectional view of the heat dissipation device of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

With respect to Fig. 1, Fig. 2 and Fig. 3, the present invention provides a heat dissipation module for CPU. The heat dissipation module comprises a heat dissipation device 10, a fan-fixing frame 20, and a fan 30. The heat dissipation device 10 is made of a metal material with good thermal conductivity, such as

aluminum or copper. The heat dissipation device 10 defines a through hole 11 in a middle thereof (see Fig. 7 and Fig. 8), which is a circular hole penetrating from a top surface to a bottom surface of the heat dissipation device 10. The heat dissipation device 10 has a plurality of fins 12 disposed around the through hole 11, and the fins 12 define flow passageways 13 therebetween for air to flow through. The flow passageways 13 penetrate through the top surface, the bottom surface, and outer surfaces of the heat dissipation device 10 to form an open shape.

The heat dissipation device 10 defines a wind guiding surface 14 in an arc shape at an inner wall of the through hole 11 near the top surface and a plurality of wind guiding holes 15 at the inner wall near the bottom surface. The wind guiding holes 15 communicate with the flow passageways 13. The heat dissipation module further comprises a thermal conductive plate 17 made of a metal material with good thermal conductivity, such as aluminum or copper. The thermal conductive plate 17 is fixed at the bottom surface of the heat dissipation device 10 corresponding to the through hole 11 via screws 16 for being disposed on a heat-exhausting surface of the CPU 40.

The fan-fixing frame 20 is located on the top surface and two of the outer surfaces of the heat dissipation device 10. The fan-fixing frame 20 has a top plate 21, four posts 22, two baffles 23, two side clips 24, and a plurality of elastic pressing components 25. The top plate 21 defines an opening hole 28 (see Fig. 6) and four connection holes 26. The fan 30 is fixed on the top plate 21 and faces the opening hole 28. Four screws 31 respectively penetrate through four corners of the fan 30 and screw to the related connection holes 26, so that the fan 30 is screwed on the fan-fixing frame 20.

The posts 22 respectively extend downwardly from four corners of the top

plate 21. The posts 22 each have a clipping element 221 protruding outwardly at a bottom thereof. The clipping elements 221 are respectively related to four clipping holes 52 at four supporting protrusions 51 of a retention frame 50. In addition, the posts 22 each have a hollow projection 222 disposed above the clipping element 221.

The two baffles 23 respectively extend downwardly from two opposite sides of the top plate 21, and two ends of each of the baffles 23 and the posts 22 define a predetermined space therebetween, respectively. The two side clips 24 respectively extend downwardly from another two opposite sides of the top plate 21, and each of the side clips 24 is disposed at a middle between two posts 22.

Each elastic pressing component 25 includes a connection part 251 and a spring 252. The connection part 251 has a hooking portion 253 at a top end thereof and a pressing portion 254 at a bottom end thereof. The spring 252 is located around the connection part 251. The hooking portion 253 of each of the four connection parts 251 is inserted onto a related piercing hole 27 defined at each of four corners of the top plate 21 of the fan-fixing frame 20. The hook portion 253 is in a inverted-hook shape so as to avoid the connection part 251 escaping from the piercing hole 27 and to install the connection part 251 onto the top plate 21 of the fan-fixing frame 20. The spring 252 is disposed between the top plate 21 and the pressing portion 254 to provide an elastic downward force for the connection part 251. Thereby, the pressing portion 254 of each of the connection parts 251 is able to elastically press the heat dissipation device 10 on the CPU 40 to assist the CPU 40 to distribute the heat.

Referring to Fig. 3, Fig. 4, and Fig. 5, the CPU 40 is disposed on a mother board 60. A retention frame 50 is installed on the mother board 60, and the

CPU 40 is disposed inside the retention frame 50. The retention frame 50 has a supporting protrusion 51 extending upwardly from each of four corners thereof. The supporting protrusions 51 each define a clipping hole 52.

The heat dissipation device 10 is disposed on the retention frame 50 at a corresponding position thereof. The heat dissipation device 10 is slightly pressed with the palm of one hand and the projections 222 of the four posts 22 are pressed inwardly simultaneously, so that bottom ends of the posts 22 swing inwardly. When the clipping elements 221 at the bottom ends of the four posts 22 of the fan-fixing frame 20 respectively correspond to the clipping holes 52 of the four supporting protrusions 51 of the retention frame 50, the projections 222 of the posts 22 are released, so that the clipping elements 221 at the bottom ends of the four posts 22 of the fan-fixing frame 20 respectively clip and position at the clipping holes 52 of the four supporting protrusions 51 of the retention frame 50. Furthermore, the two baffles 23 and the two side clips 24 abut against four outer edges of the heat dissipation device 10 to achieve a position effect for the fan-fixing frame 20. The elastic pressing components 25 thereby elastically press the heat dissipation device 10 on the CPU 40 and a bottom of the thermal conductive plate 17 abuts against the heat-exhausting surface of the CPU 40 to assist the CPU 40 to distribute the heat.

In disassembly, the heat dissipation device 10 is slightly pressed by the palm of one hand and the projections 222 of the posts 22 are pressed inwardly simultaneously, the clipping elements 221 at the bottom ends of the four posts 22 of the fan-fixing frame 20 then respectively escape from the clipping holes 52 at the four supporting protrusions 51 of the retention frame 50 and the heat dissipation device 10 separates from the retention frame 50 to complete the disassembly.

In addition, the fan 30 induces cool air to flow from an upper position to a lower position to blow on the fins 12 of the heat dissipation device 10. The cool air obtains the heat to become hot air and then flows through the flow passageways 13 and drains out of the outer surfaces and the bottom surface. Thus the fan 30 is able to assist the heat dissipation device 10 and the CPU 40 to distribute the heat to achieve better heat dissipation effect.

Furthermore, the through hole 11 and the wind guiding surface 14 guide the upper cool air to blow to a central area with high temperature of the heat-exhausting surface of the CPU 40. The cool air obtains the heat to become hot air and then flows through the wind guiding holes 15 and drains out to avoid air interference between an upward reflux of the hot air and the downward cool air to achieve a better heat dissipation effect.

Therefore, the heat dissipation module of the present invention provides a simple structure and is easily assembled or disassembled to reduce the cost of manual operation and to facilitate mass production.

In addition, because the flow passageways 13 of the heat dissipation device 10 are open in shape, the heat dissipation device 10 performs better heat dissipation effect and is easily cleaned.

It should be apparent to those skilled in the art that the above description is only illustrative of specific embodiments and examples of the invention. The invention should therefore cover various modifications and variations made to the herein-described structure and operations of the invention, provided they fall within the scope of the invention as defined in the following appended claims.